

The driving energy of a pioneer

AN AMERICAN GENIUS: THE LIFE OF ERNEST ORLANDO LAWRENCE. By Herbert Childs. 576 pp. E. P. Dutton, New York, 1968. \$12.95

by M. L. OLIPHANT

This book could have been written only by an American about an American. No British or European biographer could have conveyed the intimate detail of the life of a great man of science without creating boredom or appearing to peddle trivialities. No other biography portrays so well the atmosphere of scientific research in America during the transition from small laboratories with modest incomes derived from private sources, to gigantic institutions spending tens of millions of dollars of public money. To a very large extent it was Ernest O. Lawrence who pioneered this transformation. Herbert Childs has made the story of Lawrence's life, and of his many accomplishments, into a story that can be appreciated by any intelligent reader, and is at the same time a most valuable addition to the scholarly history of science.

The early chapters are of particular value, as they show how many of the characteristics of the man were moulded by his parents, friends, schools and teachers. His rather puritanical and prudish disposition, his attitudes towards wife and family, his intolerance of humbug and deceit, and his aloof but liberal approach to social and political questions grew out of that milieu. He was fortunate in finding Merle Tuve for a friend, because with Tuve's enthusiastic coöperation Lawrence was able to indulge the inevitable interest of the embryo scientist in the gadgetry of the time, particularly radio transmission and reception. However, the driving energy that Lawrence displayed in the pursuit of anything that interested him and the ability to shut himself off completely from anything that interfered with his immediate aim were his own. Throughout his life he was in a hurry, boyishly eager to see the results of anything he set out to do. Ever a man of action, he was impatient with those who

sought a more scholarly existence of quieter tempo.

Lawrence's individuality as a scientist was established by his work on the ionization of mercury by electron impact, which attracted the attention of Leonard Loeb and led to the invitation to move from Yale to Berkeley. There his realization that the linear resonance accelerator of Wideroe could be coiled up by a magnetic field into a much simpler and more effective resonance device, the cyclotron, established his reputation throughout the world.

Lawrence's ability to attract brilliant young men to make effective use of the cyclotron enabled him to build, in Berkeley, the greatest center of re-

search in nuclear physics existing anywhere. His dynamic personality inspired all around him, and when the necessities of war turned attention to the possibilities of producing nuclear explosives, it was natural that Lawrence and his laboratory should be in the forefront.

After the war, realizing at once the importance and power of the new methods of acceleration developed from the cyclotron by his colleague Edwin McMillan, Lawrence recreated a great peacetime laboratory that was to skim the cream of its possibilities.

Herbert Child's inspiring story of a great and generous pioneer and leader of modern physics, is a definitive account of an era that was, and will



ERNEST O. LAWRENCE, inventor of the cyclotron, relaxes on a hill overlooking the Berkeley campus. Lawrence Radiation Lab was named for Lawrence after his death.

remain, unique in the history of science.

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Sir Mark Oliphant first met Ernest O. Lawrence at the Cavendish Laboratory in 1933, shortly after the Seventh Solvay Conference held in Brussels in October of that year. Oliphant's two-part article, "The Two Ernests," appeared in the September and October 1966 issues of *PHYSICS TODAY*. He is presently a professor of physics in the Research School of Physical Sciences at the Australian National University in Canberra, Australia.

In defense of people

WHO SPEAKS FOR CIVIL DEFENSE?

Eugene P. Wigner, ed. 127 pp.
Charles Scribner's Sons, New York,
1968. Cloth \$3.95, paper \$1.65

by L. MARTON

Walter Conkrite, in his introduction to this collection of essays on civil defense, deplores apathy of both government and the public for the problems of civil defense, and hopes that the present book will set off a chain reaction of discussion, examination and finally action on civil defense. He ends his introduction with the question: "Whatever happened to civil defense?"

The answers are partially given by "those who speak for civil defense". The studies were "sponsored by the Civil Defense Forum, a non-profit corporation organized to educate the public about the problems of civil defense"

and written by physicist Eugene P. Wigner, Neal FitzSimons, of the Office of Civil Defense, Stuart L. Pittman, former Assistant Secretary of Defense, Walter H. Murphey, who surveyed civil defense in 1967, Bjorn Klinge, a Swedish authority on civil defense, and Herbert Roback, of the Military Operations Subcommittee, House of Representatives. The subjects covered are "Nuclear War and Civil Defense", "Brief History of American Civil Defense", "Government and Civil Defense", "Civil Defense Abroad", "Civil Defense and National Defense" and a brief Afterword, followed by an Appendix containing a letter to the President.

Wigner's chapter is highly technical and gives a very good description of the short-term effects of nuclear war. He analyzes the different effects of nuclear explosions together with consequences on civil defense. It is a very matter-of-fact presentation of the whole subject and contains a remarkable amount of data that are highly authoritative and presumably not subject to much controversy. The next two chapters, by FitzSimons and Pittman, describe in much detail the hesitations, false starts and changes in policy on civil defense that have occurred in the last few years. These chapters are interesting reading but not very encouraging. They reflect a kind of lack of action that characterizes several other important projects and that ham-

pered, unfortunately, many other worthwhile ones. A short quotation from one of these papers is quite significant: "We rest today on a plateau of indecision held up by operational progress, which may keep open the door for the decision makers until they are ready. And it may not, resulting in the loss of invaluable years of lead time on whatever damage-limiting system is finally decided upon." In strong contrast Murphey's and Klinge's contribution describes some of the very active civil-defense projects that have been instituted abroad.

Roback's chapter analyzes the problems arising from competition between civil defense and national defense. A prevailing view in some circles is that a strong national defense may make civil defense unnecessary. As expected, the final result of the analysis is that considerably more money is needed for expansion of civil defense, but the present conditions of money shortages make the outlook rather grim. In his Afterword, Pittman shows that the latest budget figure for civil defense was about two thirds of the request for the previous year, which in turn was the lowest figure since the Defense Department took over civil defense in 1961. He ends his remarks with a very strong criticism: "The critical long-term task of improving our chances of survival in the nuclear age may be too important to be decided exclusively in the closed chambers of a government so pinned down by today that the problems of tomorrow must be set aside and assigned 'the lowest possible sustaining rate'."

In this strong plea for an improved civil-defense attitude and improved means for it, the problem of immediate survival is very clearly exposed. A very important aspect of civil defense, in my mind at least, is the aftermath of a nuclear attack. By aftermath I mean all the effects of destruction of communications, of production, of transportation, of power distribution, and so on. Not the least of these effects will be the possible results of epidemics engendered and propagated by the confinement of the population during a certain period under unsanitary conditions. Of course the treatment of all these effects would take a much larger book than the one presented here, but I think that any serious consideration of civil defense should include a thorough examination of the long-range effects produced by any such attack. Al-

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